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Bd. Oct. 1874.

The Gift of
Daniel C. Gilman,
of Oakland, Cal.,
16 July, 1874.

Boston Academy of Sciences. 1873.

In Memoriam

LOUIS AGASSIZ.

Bulletin of the Boston Society of Natural History.

BACON & CO'S PRINT.

CALIFORNIA ACADEMY OF SCIENCES.

PROCEEDINGS

OF THE

Agassiz Memorial Meeting,

MONDAY EVENING, DECEMBER 22, 1873,

AT

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In Memoriam—Louis Agassiz.

Born May 28th, 1807. Died December 14th, 1873.

The President stated that at the last regular meeting of the Academy, this special meeting was called as a tribute to the memory of Professor Agassiz; and the programme, as arranged by the Committee, will consist of short addresses by its members, Professors Gilman and Joseph Le Conte, Rev. Drs. Stebbins and Scott, Mr. Stearns and myself.

Remarks of President George Davidson.

In his own handwriting, upon a souvenir of his Pacific Coast visit, is the legend "L. Agassiz, born May 28th, 1807." On the 14th of December, 1873, the telegraph flashed to the uttermost parts of the earth that he was no more; and we meet to-night to render homage to his memory.

After a few occasional meetings, from my first acquaintance with him twenty-seven years since, it happened to my lot last season to introduce him to the Academy and its friends, after his voyage of twenty thousand miles, undertaken at a time of life when most of us look forward for rest from life-toiling. You saw that his old enthusiasm was still ablaze; you felt the peculiar charm of his presence and voice, and were happier and better in knowing that you had come into personal relations with one who commanded such influence and power for good. So it has been through a busy, earnest life, devoted to but one object; to see him was to love him; to know him was to willingly promise service to science for all time, and to feel amply repaid in fulfilling that promise.

Learned men and statesmen, and educated, brilliant women, had hung on his words, and had paid the same tribute: all mourn with the same sorrow. In our

hearts he can never be forgotten; in the centuries hence, his influence and labors will assure students there were intellectual giants in these days.

To others, more intimate with his daily life and thoughts, must be left the analysis of that powerful hold which he maintained on all classes of men. Simplicity and purity of character, singleness of purpose, directness, and comprehensiveness of the highest order, were the bases for that subtle power which gathered facts from observation, combined and correlated them, thence deduced order; and placed them so lucidly and attractively before the learned and the unlearned.

With the permission of the Academy, I make this the occasion to say a few words upon the impetus, direction, and steadily preserved influence which he exerted upon scientific study in the United States; not only in his particular lines of investigation, but upon every other branch of knowledge. In 1846, fresh from contact with the advanced scientific men of Europe, and endowed with the amplest powers of body and mind, he saw and was delighted with the broad and untrammeled field in the country of his adoption. One rule he at once established for himself—that the results of all his investigations should be given to American, and not to foreign institutions; and to the day of his death he broke not the self-imposed obligation. He had cast his life and lot amongst us; and the communication of discoveries to others abroad—who, however, were no less his friends, admirers, and co-laborers—he deemed a special act of treason.

The many wants he discovered, upon assuming his professorship in Cambridge, would have disheartened and dismayed others less ardent and self-reliant. You recollect with what quaint and good humor he described the few dried fishes forming the collection of natural history, by which he was expected to illustrate his lectures and investigations. That want aroused in his mind the desire, and fixed the purpose, to found a museum of zoölogy which should surpass the most complete in Europe—not as a mere measure of vastness, but as the only proper means of affording the necessary material for the use of students, and for aiding the broader studies of the advanced naturalist. With constant thinking, the plan grew in scope and definiteness. Here men high in their special studies could thoroughly describe and classify every obtainable specimen, and designate their relation with each other; whilst the fossils of buried ages should reveal their story, and exhibit their correlation with the present epoch. From a critical discussion of such aggregated results, we may be assured that the law of development in the natural history of the world, whatever it may be, would be demonstrated.

He has not lived to see it. For a quarter of a century he has fought to obtain the means to perfect it, and has really succeeded as no other man upon this continent could have hoped for. But he has infused among our people the sentiment of more liberal assistance to science, and the full fruition of his labor will come to his successors.

It seems a marvel how much of the enthusiasm and industry of Agassiz has been developed among those who have studied or come in contact with him. If

there were any that became weary with the heat and burthen of the day, they have dropped by the way-side. The young, the earnest, the ambitious, are scattered over the globe, searching, working, and studying to increase our knowledge. The men of mark who have been students under him are not few; although, perhaps, differing from many of his views, they are working with his indomitable ardor. From him they have learned that their real student life but just commences when they quit the college halls for the broader and more suggestive fields where animal life exhibits itself in a thousand new relations, and suggests new methods and solutions.

In the last quarter of a century there has arisen in America a large body of the ablest naturalists, geologists, and palæontologists; and I attribute the thoroughness of their investigations, their enthusiasm and success, to the direct and reflected example of Agassiz.

But the impetus which he gave to the interesting study of natural history, to fossil icthyology, to geology, and especially to glacial action, had its effect upon all other branches of science. Remarkably well versed in every science, and intimate with the scientists in their specialties, he imparted to them, as the magnet to the steel, an equal amount of his force, directness, and thoroughness; he cheered the struggling, reinvigorated the diffident, and diffused a halo of attractiveness around each one's study.

He was especially earnest and forcible in expressing his views of scientific education. He contended for broader studies than those prescribed in the old, dogmatic curriculum; for something more than heavy, reiterated book-learning. He demanded original research, exhaustive observation, and rigorous comparison. And whilst garnering the treasures, he was peculiarly chary of propounding hypotheses and theories. To him the time had not come for laying down the law of development. He could not bear with superficial study: a man should give his whole life to the object he had undertaken to investigate. He felt that desultory, isolated, spasmodic working avails nothing, but curses with narrowness and mediocrity. Although strongly wedded to his particular objects and course, he fully realized and ably advocated the equal value and importance of the other special branches. He appreciated the fact that the tastes and peculiar mental fiber of others would lead them in other channels, and he looked forward to the time when their results should be brought into harmony with his own.

We hear so much of weak, inconsequent condemnation of specialists, that an erroneous but wide-spread misapprehension would appear to exist upon the subject. In every-day life, who hesitates to measure out commendation to the blacksmith, the printer, the farmer, the jeweler, the artist, the merchant, for excellence in their specialties? The steamship, the mansion, the bridge, are but the carefully combined results of men's labors in many special trades; and the strength and beauty of every structure and work are great and pleasing just in proportion as the special workmen are skilled. The moulding of all their results into one harmonious body is the work of another specialist, who has the comprehension to properly adjust and aggregate them.

The case is not at all dissimilar with the specialists of science. Each is gathering and logically arranging all the details of his examinations and study; whilst others are endeavoring to blend and harmonize, so far as practicable with yet incomplete observations, the results in the different branches of science. So delicate have become the means and methods of examination, so extreme the range of subjects, so intimate their correlation, that we are perforce compelled to confine our special investigations to single and very narrow lines of research. The geologist, botanist, chemist, physiologist, mathematician, subdivide their labors; cosmical physics attract one astronomer, observations of the planets another, spectrum analysis another. As the results in particular branches are announced, special discussions are entered upon to evolve the law which entwines and embraces them all. These discussions must conform to and be governed by mathematical processes. No indeterminate solutions can be admitted; for their presence indicates the necessity for more tangible facts.

It was the realization of this requirement for labor in specialties in natural history and its cognate branches, that impressed Agassiz with the necessity of a museum that should be complete in its absolutest sense; and to accomplish this he undertook his exploration on the Amazon, his voyage round Cape Horn, and had projected a voyage this coming May through the labyrinth of waters extending from Puget Sound to the Chilkaht River, in Alaska.

On the Pacific Coast we are full of faith that such a museum will be gathered by the Academy, and that, from the ample means of her benefactors, original researches in special branches of science will be systematically carried on, and the results be regularly made known in series of lectures. For general information, this method has had no abler exponent than Agassiz; in fact, he was the father of the method of popularizing science by lectures of the highest order by the investigators themselves. In the present flush of scientific lecturers we are too apt to forget that when he, many years since, commenced giving his series of lectures on natural history, fossil fishes, the glaciers, etc., freed from the usual flood of cold technicalities, he was looked upon as an innovator, and as degrading science. Fortunately, his conception of its value was the true one. A deep and abiding yearning for fresh, living information has been diffused, and, one by one, even the learned men of Europe have yielded to the pressure, and given of their abundant stores of knowledge to the humble as to the rich.

We cannot yet measure the full value of this new means of diffusing the results and methods of scientific investigations. It humanizes and expands the minds of men of power whose business, habits and pursuits have kept them apart from study since their school-boy days; it quickens the memory of the student and reader; and from the humbler walks of life it will call out the latent talent of many a gifted but timid youth, whose instincts and aspirations would have been chilled by the esoteric system of the old formal school.

In the introduction of this method of popularizing science, it was peculiarly fortunate that Agassiz had the rare power of stating so clearly and so logically, and of illustrating so rapidly and cleverly, the processes and deductions of his investigations. It was all new knowledge—not gleaned from encyclopedias or

composed of the unverified statements of others. It was mental food for the acutest thinker; it was comprehended by the youngest student. In his lectures his diction was a model of English; no straining for effect, no struggling for words, but the right word always in the right place. "I never think of the words I am to use," said he. "I arrange the matter, order, and method of statement and illustration clearly in my mind before I begin, and then the words come of themselves."

It was fortunate, also, that he had that charm of manner—modesty, simplicity, manliness, and kindness for others—which attracted and captivated his audience. In fact, it was fortunate for popular science that he was—Agassiz; for men with such a rare combination of good qualities, and such a position, come but seldom in a century.

One of the branches of scientific investigation to which he gave much actual examination and earnest thought, and by which he will be known as the great expounder, was the extent of glacial action during the period when the greater part of the northern and southern continents was under an ice-sheet of immense thickness. He first grasped the full force of the problem, and enunciated it; and his demonstrations have made clear many existing conditions on the surface of the earth, which had baffled the skill of others. Perplexities melted before it, and from chaos are emerging order and consecutiveness. In his visit to this Coast, he was particularly gratified and excited with the evidences of glacial action which mark our Sierras, and which I have shown to mark our coast-line. These, the existence of the great living glaciers of British Columbia and Alaska, and the evidences of glacial action through the thousand miles of ocean Yosemites stretching from latitude forty-seven to sixty, were some of the inducements that led him to acquiesce in the projected trip of this season. He had studied the glacial action through similar geological formations from Cape Horn northward, and, from his comprehensive knowledge and grasp of the subject, was peculiarly fitted for the discussion. Even among those who may be capable of seizing the minutiæ of evidence and realizing the magnitude of the powers which performed that work, it may be many years before any one can command the means and the time for their examination and elucidation. It requires a rare combination of qualifications for its solution, particularly that of the mechanical faculty; and we can but hope that from among our young students of California will come those who can demonstrate it successfully.

I close with a few words of a power which he possessed, so unusual among scientific men, yet so absolutely necessary for the development of science as understood by the specialists, and of knowledge as taught by the colleges, that we can but pray without ceasing his mantle may fall and cover many shoulders. Others possess it—perhaps only differing in degree—or the magnificent endowments which have been made to our higher seats of learning would have been devoted to other purposes. Yet he first made the claims of science a demand upon the affluent who had grown wealthy through the practical applications of scientific investigations and discoveries. He would admit of no compromise measures—science had taken a back seat too long; her

votaries had been sneered at as particularly deserving reprobation for lack of the money-making faculty; and he repudiated the supposed eleemosynary character of the gifts grudgingly made to her. He boldly stood forth as the champion of the self-sacrificing devotees of science. For the benefit of human knowledge he had given, with unsparing prodigality, the mental and physical activity of a life noted for its remarkable vigor, endurance, and consecutiveness; and his sense of justice was aroused to appeal for help to those who could so easily and so largely endow our colleges and universities, our museums and academies of science. You have listened to these appeals, and know that even in our midst they have not been in vain. Throughout our country the leaven has reached the treasures of large-minded men who, during their life-time, wish to see the fruition of their nobler instincts. In the last ten years, millions of dollars have been devoted to learning and science; but many more millions are needed, and the apostles of science must cease not urging and proving her claims. Our University alone needs its million for buildings, apparatus, and museum; and another million for the endowment of professorships. Our Academy needs as much for buildings, collections, and for foundations for original research. And in our midst we need an amply endowed Institute of Technology.

The interest which he imparted to science on this Coast, in one short visit, has steadily increased. The cheering words which he spoke in our behalf have fallen upon the hearts of our people, and awakened their sympathy. The Academy certainly has cause to rejoice in its benefactions; but we need still more freely the helping hand of endowment, to realize what he prophesied.

We can listen no more to the magic of his voice; but his example is ever before us. Words of praise can add nothing to his glory; but we can honor his memory by imitating his fervid devotion to science, and its diffusion among mankind. It never faltered; it pervaded his being.

He was the incarnation of Science; and greater love hath no man than this —he laid his life down for it.

He has gone; but his name will be a land-mark in human knowledge through the long roll of centuries.

Remarks of Professor D. C. Gilman.

The name of Agassiz does not belong to the learned alone, though it is honored most by the wise and the profound; it likewise belongs to the common people, for it is a household word throughout the land.

Few men, while they live, attain renown among the multitude, and also retain their eminence among philosophers; but he wore fitly this double crown —"the praise of praised men," which is gold, and the applause of the unlearned, which is silver. How few of those whom we call distinguished, whether writers, teachers, statesmen, merchants, scholars, or leaders in arms, are equally known and honored with this college professor, this comparative

zoölogist, this interpreter of nature! The news of his decease has brought to learned societies and to common schools, to universities and to fishermen's cottages, the sense of a personal bereavement, for it tells of the loss of a guide, the death of a friend.

To these twofold aspects of his character, your attention will now be directed; the speaker who follows,* by our mutual understanding, rehearsing the claims of Agassiz to scientific renown, while I am to dwell upon his claims to popular regard, or rather upon his character as a teacher, and the influence he has exerted upon American Education.

It will be generally admitted that, among all the teachers of the land, he has held the foremost place. Notwithstanding that ours was to him a foreign tongue, that he grew up to the prime of life under European institutions, and that the subjects which he taught were quite remote from what are called the "practical" wants of the Americans, he always spoke among us with that extraordinary power of adaption, that easy self-possession, that rare adjustment of thoughts and words to the occasion, which constitutes true eloquence—which attracts, enlightens, delights and persuades. Before the Legislature of Massachusetts or the National Academy of Sciences, in the college lecture-room or in the teachers' institute, on the public platform or in the private parlor, in the open field or on the vessel's deck, he was always the same—ready, graceful enthusiastic, earnest, suggestive, and instructive. He delighted to learn, that he might teach; to teach, that he might learn.

When such a man departs, old, honored, unsullied, and beloved, it is well to inquire into the antecedents of his character, the elements of his renown.

It is not every teacher who is endowed with a good constitution, neither too nervous, nor too phlegmatic. Agassiz was fortunate in his physical character, his noble figure, his beaming countenance, his elastic step, his excellent health. He was not of that type of scholars whose shriveled faces and whose withered forms declare the neglect of exercise, and the misuse of food; nor was he one who gained by stimulants extraordinary force. He possessed what might be called a commanding presence, a favorable personal equation, a magnetic influence, a manly beauty, or an easy dignity—a quality not to be defined, but everywhere appreciated, which may be in-bred, yet must be first in-born. He came of good descent, having a mother of rare intellectual qualities, and on his father's side an ancestry of six generations of Protestant ministers, going back to the Huguenot refugees. But his was not the parentage of wealth or fashion, and the narrow circumstances of his early life quickened his industry, his patience, and his persistence, and fitted him forever after to sympathize with and encourage those who have high aims and shallow purses.

His early culture was most liberal. In many countries, and through many years, his studies were prolonged. Four years, the record runs, in the gymnasium at Brienne, two years in college at Lausanne, two years in the medical school at Zurich, five years in the universities of Heidelberg, Munich, and Erlangen, that is, thirteen years, at least, of preparation in the period of youth.

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* Prof. Joseph Le Conte.

Thus he came in contact with some of the most renowned naturalists in Europe —Cuvier, Humboldt, Martius, Spix, and a host besides—and received that intellectual impress from superior minds which is far more influential than a library full of books, or a city full of museums.

Hence he laid a broad basis for his scholarship. Ancient and Modern Languages, Philosophy, Human Anatomy and Physiology, Botany, Mineralogy, Geology, and Zoölogy, were all pursued with such enthusiasm, that in any of these departments he might have been distinguished.

So was he qualified to teach—by natural endowments, personal presence, honorable ancestry, narrow circumstances, prolonged culture, and broad foundations. What, now, were the consequents of such antecedents—the superstructure on such a foundation?

There was supreme kindliness or self-control in his disposition, which led him to be patient with ignorance, and what is harder yet, with arrogance; which made him generous in bestowing his time, his learning, and his letters upon others; which made him accessible to the most timid student, or the most humble discoverer of a curious bug.

To this was added a charming enthusiasm, which gushed forth in no spasmodic intermittence, but bubbled up perpetually with refreshing effervescence He captivated all whom he met. He made them believe that his work was his play; that they might engage in it with a surety of reward. He seemed to say perpetually to his associates, as Faraday said to Tyndall, under untoward circumstances: "Our subjects are so glorious, that to work at them rejoices and encourages the feeblest; delights and enchants the strongest."

Genuine gratitude was also conspicuous in all he did. The school-boy who brought him an uncommon fish, or the farmer who sent him a nest of turtle's eggs, or the woodsman who favored him with a family of little rattlesnakes, was as sure of his hearty acknowledgments as the millionaire of Boston who endowed his museum, or the tobacconist of New York who bought for him Penikese Island, or the officers of the Government who placed at his command the resources of the Coast Survey. No emperor or king ever received such homage, voluntarily bestowed by high and low alike, or such tributes from the united realms of earth, and air, and sea; none return such gratitude. This gratitude was marked by unmistakable sincerity. His looks, and tones, and the pressure of his hand, all confirmed the utterance of his lips. No one need fear that when the private letters of Agassiz are made public there will be anything to regret, as there was in the posthumous revelations of one of his most illustrous contemporaries.

There was, moreover, a hearty co-operation with other workers, and in other spheres—a friendly indorsement of their efforts which was free from the tone of patronage or of interference. The members of this Academy must well remember the generous words which he uttered on the evening when he first set foot in San Francisco—his congratulations at the success of the Academy, his words of encouragement for the University, and his eulogy of the Geological Survey, the pride of all the science of the State.

Still more remarkable in Agassiz was his readiness to aid in the diffusion of knowledge. Devoted as he was to scientific researches—to the advancement of learning by investigations of the most profound sort, extending down to the lowest organisms at the bottom of the sea, and back to the remotest æons of geological history—he was always ready to come before the public and bring the newest and the best of his acquisitions. There are such men as intellectual misers, but he was not of that race. There are also those who are deaf and dumb, but he used all his faculties. He did not wait for costly diagrams or extraordinary specimens. A blackboard and a piece of chalk were all the apparatus which he required for a lecture on Natural History. At the oldest University in Cambridge, or at the newest in Ithaca, through the *Atlantic Monthly* or the extra *Tribune*, in the National Academy, or on Penikese Island, in the State house at Boston, or in Pacific Hall at San Francisco, he was ready to teach all who wished to be taught. The wisest would enjoy the clearness, the liveliness, and the method with which he told his tale; and the uninformed would think they were growing wise, because they could follow so agreeably and intelligently the utterance of a master. He believed in the Public Schools; and the newspapers say that one of the last acts of his public life was to give a lecture at a teachers' meeting.

As a popular teacher, Agassiz was undoubtedly aided by his devout reverence, which saw in Nature something more than a force or law, or rather, which believed all law and force to emanate from a Law-giver and a Ruler. He did not obtrude these opinions. He was not more fortunate than other men of science in escaping the attacks of bigotry and superstition; but now and then, like a church-bell tolling on a Sabbath morning, deep utterances would come forth expressive of his faith. For example, at the close of his essay on "Classification," occurs this passage: "All the facts proclaim aloud the one God, whom man may know, adore, and love; and Natural History must in good time become the analysis of the thoughts of the Creator of the universe, as manifested in the animal and vegetable kingdoms." (*Contribution to Natural History of the United States.*)

Thus we see that the supreme kindliness, charming enthusiasm, genuine gratitude, unmistakable sincerity, uniform co-operation, incessant desire to diffuse as well as to advance knowledge, and devout reverence, were among his most conspicuous qualities as a teacher. I do not dwell upon his love of truth, for that is fundamental with all real men of science; nor on his abstinence from money-making, for all legitimate university life precludes the professor from wild speculations on the one hand, or from regular business responsibilities on the other; nor do I dwell upon his love of studies remote from their practical bearings, for the student of Nature never knows what profound benefits to mankind may proceed from the most abstract research. In these respects I do not know that Agassiz differed much from other naturalists, but in native gifts, and in the acquisitions of varied culture, there are but few to be compared with him.

Hence he has exerted a powerful influence upon American education. It is true that he was fortunate in colleagues and in circumstances. Guyot came

with him to this country from Switzerland, and in a different sphere, and with different intellectual endowments, has shown many of the qualities which distinguish his life-long associate. Their united work among the teachers of Massachusetts will always be gratefully remembered by the friends of popular education. Dana, when Agassiz arrived, had recently returned from his voyage around the globe, laden with rich treasure of thought and observation, and in his enlightened and impartial conduct of the *American Journal of Science*, was a powerful ally in the promotion of all departments of scientific education and research. Bache and Henry, at the head of two great departments of the Government, the Coast Survey and the Smithsonian Institution, were able to turn the national resources toward the same great purposes. Torrey and Gray had already given world-wide reputation to American Botany, and Pierce had advanced the science of Mathematics. The gifts of Lawrence, and Sheffield, and Peabody, successively brought new and advantageous impulses to the study of Natural History. The explorations of the Western States and Territories, the settlement of California, and the surveys of the Pacific Railroad route, created a demand for trained geologists and naturalists. Young men were attracted to Cambridge by the renown of the Swiss professor, and, after learning wisdom in his laboratories, went off to found and develop new institutions in Salem, Boston, New Haven, Ithaca, and Oakland, or offered themselves to the service of the State or nation. Teachers in the common schools, especially in New England, learned how to awaken an interest in the study of Nature. Congress, in 1862, made a generous provision for scientific schools; and now, a quarter of a century from the coming of Agassiz, scientific courses run parallel with classical courses in most of the colleges of the country. I am far from attributing all this progress to any individual. It is the movement of science, in a new country, and in the nineteenth century; but I do not hesitate to say that among all the great and serviceable men who have helped on this spirit of research and of investigation, none is more worthy of grateful homage than Louis Agassiz. Especially was he noteworthy for his opposition to the rote-teaching in scientific text-books; for his encouragement of local studies—researches about home; and for his persistent employment and recommendation of the art of drawing as an indispensable aid in scientific research.

If I may be allowed to make an allusion to my own relations with Professor Agassiz, I will say that the greeting which you gave him, and the greeting which he gave me in the halls of the Academy, fifteen months ago, filled me with assurance and courage. It was not long afterward, before his visit here bore fruits, and the liberality of Edward Tompkins, of Oakland, endowed in the University of California a professorship which is to bear in all time the name of Agassiz. Scarcely two months ago I sat in his study at Cambridge, and answered his inquiries about California, and the friends whom he met here. I congratulated him on the recovery of his health, and heard his declaration that he had at his command all the funds which he could well employ for two years to come. Scarcely ten days have passed since I received from an Eastern society a request, which was made at the suggestion of Agassiz, that I would prepare,

or cause to be prepared, a paper on the commerce of the Pacific in its relations to San Francisco. Then came the telegram that he was gone.

Agassiz is gone! His name is henceforth enrolled among the immortals. Whatever personal deficiencies he may have had, whatever of the imperfections or weaknesses which belong to humanity, will soon be forgotten, and his worth will be more apparent as the years roll on. Hereafter he will be remembered with Linnæus, and Cuvier, and Humboldt, and others, whom the world delights to honor for their scientific researches; with Franklin, and Rumford, and Faraday, who have made popular the sciences which they have likewise advanced. So we lay upon his tomb our perishable garland, and say, Farewell, philosopher and philanthropist! Farewell, our teacher and our friend!

Remarks of Professor Joseph Le Conte.

Mr. President and Gentlemen, Members of the Academy of Sciences: I respond the more willingly to your invitation to say something in honor of Professor Agassiz, because I owe personally so deep a debt of gratitude to him as my teacher. For some fifteen months in the years 1850–51, as his private pupil, I spent the whole working hours of nearly every day by his side, either in the laboratory, or else in excursions along the shores of Massachusetts, or over the mountains of New York, or on the reefs and keys of Florida. The result of this long intimate association was, on my part, a great and ever-increasing love, admiration and reverence for him, both as a scientist and as a man, and on his part, I am sure, a very strong and affectionate regard. It would be very pleasant to me to linger here a moment—to speak of him as a man and a teacher; the contagiousness of his enthusiasm, the abundance and suggestiveness of his thoughts, the greatness of his intellect, far greater even than his work, and, therefore, contrary to what we find in little great men, the increase of his intellectual stature as you approached him nearer and nearer. It would be pleasing to me to linger here, but I have a higher duty to perform, and one which I am sure would be more pleasing to him. In speaking of a man of science, before a scientific body, it seems to me peculiarly appropriate that I should try to show the *true grounds of his great reputation, and the reasons for believing that it will be permanent.*

In the noble army of science—that army so compactly organized for the conquest of darkness and the extension of the empire of light—there are many valiant fighters, but there can be but few *leaders.* In the construction of the great temple of science—that eternal temple made without hands—the only temple ever erected by man worthy to be dedicated to the great Author of nature—there are many busy, eager, joyous workmen, but there can be but few *master-builders.* Now, I wish to show that in the construction of the temple of science, Agassiz was not only an indefatigable worker in all the lowest details, with chisel and hammer and trowel, in brick and stone and mortar, but also a great *master-mason;* that in the army of science he was not only a valiant fighter in the very front rank, but also a *great leader.* In a word, I wish to show that he was not only an indefatigable enthusiastic worker in all the lowest details of his

chosen science, observing, collecting, arranging, analyzing, classifying, but also a *great philosophic thinker*—that his life and work form an epoch in science—that in looking back over the track of time, his gigantic stature will remain for many ages to come a conspicuous landmark.

As we look back over the history of science, we see, at long intervals, certain men who seem to tower far above their fellows. In what consists their greatness? They are men who have introduced *great ideas* or *new methods* into science—ideas which extend the domain of human thought, or methods which increase our power over nature, facilitate the progress of discovery, and thus open the way to the conquest of new fields. Such men were Copernicus, and Galileo, and Kepler, and Newton, and Herschell, in astronomy: such were Linnaeus, and Buffon, and Cuvier and Agassiz, in organic science.

Let me illustrate the effect of the introduction of great ideas into science. I will select one example from astronomy, and one from geology.

Before the time of Copernicus and Galileo, this, our earth, was *all of space* for us. Sun, moon, and stars were but little satellites revolving about us at inconsiderable distance. Astronomy then was but the *geometry* of the heavens, the geometry of the curious lines traced by these wandering fires on the concave board of heaven. But with the first glance through the telescope, the phases of Venus and the satellites of Jupiter revealed the existence of other worlds beside our own. In that moment the fundamental idea of modern astronomy, the idea of infinite space filled with worlds like our own, was fully born in the mind of Galileo. In that moment the intellectual vision of man was infinitely extended.

Again, before the time of Buffon and Cuvier, this, our human epoch, the history of our race, was *all of time* for us. Shells and other remains of marine animals had, indeed, been found far in the interior of the continents, and high up the slopes of mountains, and there had been much speculation as to the origin of these. Some may have thought by means of these to extend the limits of our epoch, but none dreamed of other epochs. Some may have thought they were discovering new coast islands along the shores of time; but none dreamed that these were the evidences of new worlds in the infinite abyss of time. It was reserved for Buffon and Cuvier first to recognize the entire difference between fossil and living species. In that moment was born the fundamental idea of geology, the idea of infinite time containing many successive epochs, or time-worlds like our own. In that moment the intellectual horizon of man was again infinitely extended.

These two are the grandest moments in the history of science; yea, in the intellectual history of our race. The one opened the gates of infinite space, and showed us many space worlds; the other opened up the gates of infinite time, and showed us as many successive creations or time-worlds.

We see, then, the intellectual impulse communicated by a great new idea. The introduction of a new method, though less striking to the imagination, is perhaps even more important. We will illustrate it presently. Now, I wish to show that Agassiz, too, was the originator of new ideas, and the introducer, or

at least the perfecter, of new methods in science. Yes, Agassiz was the originator of a great new idea in geology, and the introducer or perfecter of a new method in organic science.

For nearly a century past, glaciers, their structure, their mysterious motion, and their effects, have been the subject of the intensest interest to scientists; an interest which is deepened by the splendors of mountain scenery and the perils of mountain travel. The most eminent men have successively expended their energies upon these problems: De Saussure, and Charpentier, and Huger, and Agassiz, and Guyot, and Forbes, and Tyndall. To the physicist, the two points of greatest interest are, the *law* of glacier motion and the *theory* of glacier motion. Now, in the din and confusion of discussion, as to whether Agassiz or Forbes first discovered the true *law* of glacial motion, and as to whether Forbes or Tyndall advanced the true *theory* of glacial motion, it seeems to have been almost forgotten that to Agassiz and Guyot is due the credit of something far greater than either the law or the theory of glacial motion. I put aside with bare mention the immense mass of accurate observations accumulated by Agassiz, and embodied in his great works—the "Etudes des Glaceers" and the "Système Glacière," a treasury from which all subsequent writers have drawn. I put aside also all questions as to the laws and the theories of glacial motion, important as they are, as trifling in comparison. I desire to fix your attention on only one great idea introduced by him, viz: the idea that glaciers are now, and have been to a much greater extent in a previous epoch, *a great geological agent*, sculpturing our mountains and determining the forms of our continents.

Let me trace the history of this great idea. Agassiz and Guyot had studied minutely the evidences of the former extension of the glaciers of Switzerland. Guyot had even traced the outlines of these ancient glaciers, and thus established the existence of a glacial epoch in that country. With these results still fresh in his mind, Agassiz visited England in 1844 or 1845 (I know not the exact date, nor is it important), and quickly recognized the footprints of glaciers all over the mountains of Wales and Scotland, and astonished the world by announcing that these regions were moulded beneath an ice-sheet. In 1846 he came to this country, and again tracked the steps of glaciers all over the surface of New England, and again astonished the world by announcing that all the northern portions of the United States were also moulded beneath an ice-sheet. It is unnecessary to trace the extension of this idea from country to country; suffice it to say, that it was soon recognized that there was a glacial epoch not for Switzerland only, but for the whole earth. Before Agassiz, the study of glaciers was the study of nice questions in physics, and of interest principally to special physicists. Agassiz transferred the whole subject into the broad domain of geology, and gave it a far deeper, broader, and more general interest. The result was not only a powerful impulse to the study of glaciers, but a flood of light shed upon the whole later geological history of our earth, and thus an enormous impulse to geology also.

But I said that Agassiz was a great reformer in zoölogy also—that he was also, if not the first introducer, at least the perfecter of the great method of

organic science. This must ever remain the chiefest glory of Agassiz. Yes, far greater than all his great works in zoölogy—as great as these are, a monument of industry and genius—far greater than these is the *method* which underlies them, and which has impregnated all modern zoölogy.

Let me pause a moment, in deference to the intelligent but unscientific of this audience, to explain the meaning and show the power of scientific methods. Scientific methods bear the same relation to *intellectual* progress which machines, instruments, tools, do to *material* progress. The civilized man is not superior to the savage in physical strength. The wonderful mechanical results achieved by civilized man are possible only by the use of *mechanical contrivances*. So, also, the scientists differ from the unscientific not by any superior intellectual power. The astounding intellectual results achieved by science have been attained wholly by the use of *intellectual contrivances*, called methods. As in the lower sphere of material progress, the greatest benefactors of our race are the inventors or perfecters of new mechanical contrivances or machines; so in the higher sphere of intellectual progress the greatest benefactors of our race are the inventors or perfecters of new intellectual contrivances, or methods.

To illustrate the necessity and power of method, take, for example, the method of *notation*, characteristic of mathematics. How simple the contrivance, and yet how powerful! Nine numeral figures, having each a value of its own, and also a value depending upon its position: a few letters—a and b, x and y, connected by the symbols $+$ and $-$: that is all. And yet by the use of this simple contrivance the dullest boy in your public schools may accomplish intellectual results which the greatest philosophic genius could not otherwise attain. As soon as we leave the field of abstract thought and rise into the field of phenomena, *observation* commences. But as in the field of pure thought, thought can accomplish little without method; so in the field of phenomena, observation can accomplish little without the assistance of method. The phenomena of the external world are so complex, so affected by disturbing forces and conditions, that in order to be understood, they must first be simplified. The scientist, therefore, by *experiment*, removes one condition after another, and one disturbing force after another, until the true cause and necessary condition is perceived. This is the great *method of experiment*, upon which rests the whole fabric of physics and chemistry. But when we rise still higher into the field of organized bodies, the phenomena become infinitely more complex and infinitely more difficult to understand without the assistance of method, and yet, just here, the method of experiment fails us, or, at least, can be used only to a very limited extent. The conditions of life are so complex, so nicely adjusted, so delicately balanced, that when we attempt to introduce our rude hands in the way of experiment, we overthrow the equilibrium, we destroy the very conditions of our experiment, viz: life. In this dilemma what shall we do? Fortunately, nature herself prepares for us a most elaborate series of experiments. The phenomena of life in the higher animals and plants are indeed far too complex to be understood; but if commencing with these we go down the scale, we find these phenomena becoming simpler and simpler until they

reach the simplest expression in the microscopic cell or microscopic spherule of protoplasm. The equation of life is reduced to its simplest terms, and then, only, we begin to find the value of the unknown quantity. This series I will call *the natural history series*. Again, nature prepares for us another series of experiments. Commencing with the *mature* condition of the higher animals, and going backwards along the line of individual history through the stages of embryo, egg and germ, we find again the phenomena of life become simpler and simpler, until we again reach the simplest condition in the microscopic cell. This, I will call the *embryonic series*. Again, that there might be no excuse for man's ignorance of the laws of life, nature prepares still another series of experiments. Commencing with the fauna and flora of the present time, and going back along the track of geological history, through Tertiary, Secondary, Palæzoic and Eozoic, to the very *dawn* of life, we find a series of organic forms becoming simpler and simpler, until we again reach the simplest term in the lowest conceivable forms of life. This I will call the *geological* or palæontological, or evolution series.

Now it has been by extensive comparison in each of these series up and down, and by extensive comparison of the three series with each other, that our knowledge of organisms has gradually become scientific ; that mere accumulation of facts and phenomena has grown with science ; that a mere heap of useless rubbish has been changed into a beautiful edifice. This is what is called the *method of comparison*—the great method used in the science of life. Yes, anatomy only becomes scientific through *comparative* anatomy. Physiology only becomes scientific through *comparative* physiology ; and I may add, psychology will never become scientific except through *comparative* psychology.

So much I have said to show you the nature and power of scientific methods and especially of that method—the method of comparison—upon which rests the whole fabric of the science of organisms. Now what has Agassiz done in perfecting this method ? I will attempt to explain.

We have seen that this method consists of *three subordinate* methods which lead to similar results. viz : comparison in the three series, the natural history series, the embryonic series, and the geological series. Now Cuvier and his co-laborers introduced and perfected comparison in the natural history series and thus laid the foundation of scientific zoölogy ; but Agassiz and Von Baer and their co-laborers extended the method of comparison into the embryonic and geological series, and also into the relation of the three series to each other ; and thus greatly perfected the method and increased its power. Others, no doubt many others, assisted in the great work, but Agassiz was unquestionably the leader in the movement. For forty years Agassiz worked incessantly, enthusiastically—even to the breaking down of his strong physical constitution and the sacrifice of his life—on the ideas and the methods conceived in his youth. *Is not this a great life ?*

Finally, let us glance at some of the results of Agassiz' method. The *direct* result is too familiar and obvious to dwell on. We see it in the amazing impulse given to Biology and its consequent great and ever-increasing progress in

recent times. I will only very briefly draw your attention to the *indirect* results, *i. e.*, results which were not in the mind of Agassiz nor aimed at by him.

1. Agassiz' work and Agassiz' method prepared the whole ground and laid the whole foundation for the modern doctrine of evolution. The idea of the *similarity* of the three series mentioned above—the natural history, the embryonic, and the palæontological—and therefore *the light which each sheds on the others*, a view so long insisted on by Agassiz and so tardily and grudgingly accepted by zoölogists, forms the whole scientific basis, and comparison in these three series, the whole scientific method, of the theory of evolution. Evolution is development. Evolution of the organic kingdom is development of the organic kingdom through geologic times. No one insisted so long and so strongly on development of the organic kingdom through geologic times, as did Agassiz. All that is grandest and most certain in evolution, viz: development from lower to higher, from simpler to more complex, from general to special by a process of successive differentiation, has always been insisted on by Agassiz, and until recently only grudgingly accepted by English zoologists and geologists. In this sense, therefore, Agassiz is the great apostle of evolution. It was only the *present theories* of evolution, or *evolution by transmutation*, which he rejected. His was an evolution not by *organic forces within*, but according to an *intelligent plan without*—an evolution not by *transmutation* of species, but by *substitution* of one species for another. In the true spirit of inductive caution, perhaps of excessive caution, he confined himself strictly to the *formal laws* of evolution, and no man has done so much in establishing these as he; but he regarded the *cause* of evolution as beyond the domain of science, and all attempts at a *causal* theory as at least premature if not altogether vain.

2. Agassiz' work and Agassiz' method has laid the only foundation of a possible scientific sociology. Society also is an organized body, and therefore subject to the laws of organisms. Society, too, passes by evolution from lower to higher, from simpler to more complex, from general to special, by a process of successive differentiation. Society *progresses, develops*. This is the most glorious doctrine of modern times. The phenomena of society, however, are even more complex than those of organisms, and therefore still more in want of a method. But we have already seen that phenomena which are too complex to be analyzed by experiment can only be brought into subjection by the method of comparison. If, then, there shall ever be a scientific sociology, it must be by the use of the same methods which are used in biology; it must be by the comparison of social institutions, governments, civilizations, etc., in all stages of development; it must be by extensive comparison of social phenomena in *three series*, first, as exhibited in *different races and nations* in various stages, as now existing in different places, corresponding to the natural history series; second, as exhibited in various stages of advance of the *same nation* from barbarism to civilization, corresponding to the embryonic series; third, as exhibited in the slow onward progress of the *whole race* through rude stone age, polished

stone age, bronze age, and iron age, corresponding to the palæontological series. It is by comparisons of this kind that Herbert Spencer is now attempting to lay the foundations of a scientific sociology. I repeat it: if sociology ever becomes a science it will owe much to the genius and the method of Louis Agassiz.

Owing to the illness and consequent absence of Mr. Stearns, the following from him was read by Prof. E. S. Carr:

Remarks of Robert E. C. Stearns.

Mr. President.—It has pleased you to insist that I should add something to the general expression of sorrow and of eulogy. It is in no spirit of reluctance that I hesitate to bear testimony to the merits of him to whose voice it was so pleasant to listen, and in whose presence it was a pleasure to be; but rather from the fear of my inability to render an even measure of justice to the dead.

Without enlarging upon those exterior characteristics by which he was known, and which, ennobled by a generous nature, gave grace and dignity to his person, we find with and above these attractions a moral and intellectual greatness and simplicity, which endeared him to his fellow-men.

I cannot recall the name of any other scientific man, which has been so often spoken, and with so much respect and affection, in the homes and families of our people, as that of Agassiz.

This respect and affection arose, not alone from his intellectual achievements or from the popularity of his lectures and writings, but from that large-heartedness which made him accessible to all.

In his intercourse with his fellow-men, he graduated his speech not by the rank or station of the person, for each and all were received with unmeasured courtesy and kindness.

Such intellectual breadth, moral excellence, and estimable qualities as he possessed, are seldom found in the same person; and these made him not only an impressive and attractive teacher, but, combined with enthusiasm, inspired all with the desire to serve and assist him; hence, in part, that vast aggregation of material at Cambridge, beyond the capacity of the present building for its proper arrangement and display.

What wonderful progress has been made in our country since the arrival of Agassiz, in 1846! Its material wealth how enormously increased, broad areas peopled, new States established, and the march of empire pushed westward to the sea. At that time for the year of his arrival may be regarded as a notable and important event in the history of the country, within a few rods of this spot, the waters of the Bay rippled along an almost untrodden beach. Do you remember his concluding remarks at the Academy's rooms, on that September evening, a little more than a year ago? He said: "When I saw to-day, for the first time, San Francisco through the Golden Gate, I was amazed. I look upon it as one of the marvels of modern times that there should be a

city standing upon these shores, so grand, so prosperous, so rich, and so young." Great and manifold as are the changes we have noticed, great also has been the progress of science and intellectual advancement in the nation. The increased and constantly increasing interest in scientific study and literature is most marked and astonishing.

I cannot but remember, and with regret, that when a boy some thirty years ago, when first I became interested in the study of natural history, there were neither books nor teachers. How often have those early disadvantages been brought to mind, from time to time, as in after years I added to the muster roll of friends, the names of younger men who were privileged to sit under the teachings of the great master.

As some good mother, by the fireside's glow, spreads the new book upon her lap, and, calling her children near, points out the pictures and explains their meaning; so he, with radiant face and winning voice, gathered around him those nature-loving boys, and, opening wide the book of the greater mother, page by page, pointed to its living illustrations—explained their history and their relations, their beauty and their use.

How shall we estimate the value of early training under such a teacher?

Of the earlier students, Stimpson has passed away. He had accumulated, though but forty years of age, the ample store of more than twenty years' investigation. His manuscripts and plates were destroyed by the great fire in Chicago. Of this sad event and its effect upon him he wrote: "My own books, collections, manuscripts, and drawings—twenty years' work—all gone." What a pang must have shot through his heart as he wrote that line! "His old teacher offered him all the resources of the museum at Cambridge, but, with all his old love for the work, his strength was gone."

We may speak freely of the dead, if no evil is in our speech; but delicacy suggests that we should cautiously praise the living.

Other members of the earlier classes are professors and teachers in various colleges and schools throughout the country, or faithfully toiling in some field of investigation. I may not call their names. Many have already acquired distinguished reputation, and all are contributing to "the sum of human knowledge." Some of them are borne upon the roll of this Academy, and share with us the duties of this occasion.

A few days more than eighteen months have gone since Stimpson died; and now the illustrious teacher has followed his old-time pupil, on the same inevitable path.

Shall we not pause, before we say farewell, and review the labors and services of the master, since the day when he made our country his own?

How much, what part of our intellectual growth and material advancement, with its resulting higher and expanding civilization, is due to him?

Of those lofty qualities which lift man above the merely imitative and sensual animal, and place him nearer the divine—in all which makes a people wise and virtuous and a nation great—who has done more to disseminate the seed and encourage the growth than Louis Agassiz?

And now we say, good-bye! The form we knew and called by his name will soon fade away; but the effacing fingers of decay can never mar the record of his noble life.

At the conclusion of Mr. Stearns' paper, Dr. Carr remarked as follows:

Yes, Mr. President, Agassiz is not dead. He has gone to sit with Humboldt and Cuvier, with Plato and Aristotle, among the stars; the voice of humanity, echoing down the corridors of time, and gathering fullness through the coming ages, will ever proclaim as long as a love of knowledge endures—*Agassiz still lives.*

Remarks of Rev. Dr. Horatio Stebbins.

Mr. President, Ladies and Gentlemen: It would not be appropriate to me in this presence, and after what has been said by those who have preceded me, to undertake to give a *resumé* of Agassiz' scientific thought, or to sketch his career as one of the great interpreters of Nature's law; but while I have been sitting here listening to the words of others, and looking into your faces, I have been impressed anew by that cheerful, harmonious accord of reason, intelligence, and all magnanimous sentiments with which we acknowledge human greatness. With what refreshing admiration—with what proud, grateful, sympathizing joy do we stand on these level plains of existence and look up to those vast mountain ranges whose solitary summits attest man's intellectual and moral grandeur, and the permanence of truth! It is the felicity of the scientific man, that the truth he seeks is cosmopolitan. It knows not state or nation, tribe or race, but is world-truth and world-law. The distinguished representatives of that truth have a clear atmosphere, and if their moral nature is strong enough to sustain itself in those rarified heights, they lead a life of singular dignity and freedom, their minds dashed with no color of prejudice or passion—seeking what is. To know what is in the world of things, is the vocation of the man of science. His reputation is the reputation of truth, strong and still as the sun; and his name is the property of mankind. In the enthusiasm of admiring grief, we accord to our late illustrious fellow-citizen and cosmopolite such a place and such a name.

Far back, ascending the centuries, in the very horizon of man's intellectual history, is Aristotle, in whose mind the seeds of the universe were planted, who compassed all the knowledge of his time, and gave the hint to future ages. Two thousand years later is Humboldt, who, with matchless wonder of comprehension and penetration—with a persistency of purpose and idea, pursued, without a parallel in the life of man, through a period of nearly seventy years of original research—constructed a "Cosmos," the science of the relation of things, which is perhaps the source of more of the knowledge of the modern time than has come from any other single mind. In our own time, and in the near distance of

the present, is Agassiz, who, coming forward at a period when science was so complex as to render universality impossible, devoted himself to the investigation of the living forms upon the surface of our globe, and to finding the thread of order and law running through all organized beings. His mind was at once incisive and comprehensive, analytic and synthetic; while a fine glow of poetic insight and feeling suffused his whole intellectual and moral frame. It was this poetic nature, expressed in elevated, restrained enthusiasm of purpose and idea, that enabled him to give such an impulse to scientific studies in America. He had the rare ability of pursuing original research and of transforming it into popular knowledge—a hazardous undertaking for some, inasmuch as the popularization of science is accomplished through dense and refracting media, which impair intellectual rectitude and degrade the scientific standards of truth to practical and economical relations. To extend the domain of science is one thing, to diffuse science is another thing; and the two are rarely united.

Agassiz claims my admiration for the firmness and simplicity with which he maintained the right of science to pursue its own investigations in its own domain, without controversy, and without reference to any prejudices or opinions that might be held in any other department of knowledge or experience. With the old conflict between science and religion he had nothing to do. He had frankness and truth enough to confess that there is as much dogmatism in science as in religion; but he knew that essentially there is no conflict between them, and never can be. Their boundaries are undefined, as the boundaries between the known and the unknown, the apprehended and the comprehended, always will be. It is one of the infirmities of the human mind to become provincial in its conceptions of truth, and to judge the universe of things by the standards of its own village experience. Agassiz did much to enlarge and enlighten the mind, by teaching that the outward world is an expression of the thought of God, and that man's science is the discovery of God's law.

He was indeed a light and a life! That life has finished its earthly course, and that light is extinguished from our earthly horizon. It must be considered a happy event to us here, that he visited once these western shores. It is a privilege to have seen him; as it is a profound satisfaction to feel that the distinguished expressions of human nature are of kindred blood with ourselves. As I looked on him and called to mind the recollections of former days, admonished of the malady that was destroying him, I grieved for living men; but I did not grieve for him—there was so little of him that could die.

Remarks of Rev. Dr. W. A. Scott.

Mr. President, Ladies and Gentlemen: I did not know till I entered the hall this evening, that I was expected to have the honor of saying a word to you on this interesting occasion, but being urged to appear on the platform I could not absolutely refuse, because as a citizen it was in my heart to honor, as far as in me lay, this memorial meeting, and as a member of this Society to aid in tendering our respects to the memory of our illustrious dead. Another reason for

opening my lips is to endorse the sentiments of Rev. Dr. Stebbins, just uttered in regard to the alleged or supposed antagonism of science to revealed religion. Believing as I do, as intimated in the reference made to the opinions of the late Louis Agassiz, that there is as much *dogma* in science, or even more than in religion, I am ready to say and boldly maintain that there is not, and cannot be, any real antagonism or controversy between true science and true religion. All truth is of God and is a unit. Science and religion are twin sisters from the throne of the Eternal Lawgiver. There is no real controversy between them—no strife but as to which branch of knowledge can do most for mankind. Properly interpreted, they come from the same glorious hand and tend to the same result—the happiness of mankind and the glory of the Creator. I honor science, and heartily bid God-speed to every honest investigator of the laws of the universe. As a theologian I have never had the slightest fear concerning the advance of true science. Our natural philosophers cannot travel so far but they will find the Creator has been there before them; and as they climb through space and journey among planets and systems unnumbered, they will all find that the ladder by which they have ascended to the very outposts of the universe was built for them by the hand of an all-wise Lawgiver possessed of supreme intelligence, will, and power. No, ladies and gentlemen, there is no real controversy between true science and religion. Their mission is one—the progress of mankind to a higher degree of knowledge and sincere purity. I have ever believed in free thought, free speech, and a free press—not *toleration*, but absolute freedom. It is thought that governs the world.

But he must be a braver man than I claim to be, who would undertake to entertain such a presence as this at such a late hour, and especially after the learned and eloquent remarks that have been made by the gentlemen who have preceded me, even if I had an address prepared, which I have not. All I can venture to say is, that in doing honor to our distinguished fellow citizen, we honor ourselves. Some nations honor their dead in one way, some in another. Some build monuments or found institutions to perpetuate their names to coming generations. The eloquent addresses already delivered have told us of the exalted character of our great scientist as a man, a citizen in all the walks of life, of the magnetism of his presence and speech, and of his wonderful abilities as a teacher, and of the results or net gains to the scientific world, as the perfecter, if not the original proclaimer, of a *new thought* and of a *new method* of scientific experiments, which are revolutionizing many of the departments of scientific philosophy. We need not then offer a hecatomb at his tomb. It may be true, in a limited sense, as the heathen sages have said, "Those whom the gods love die early," and for us, too early has *Louis Agassiz* passed from us through glory's morning gate to the *great majority* gathering on the shores of "the beautiful river," where the flowers never fade. But not too early for himself, nor for the cause of science to which his whole nature was consecrated. You have been told that the telegraph wires flashed to us the sad intelligence "Agassiz is no more." This is a popular but an erroneous announcement. True, he is no longer on earth to be seen in the high places he so long honored. We shall look no more here upon

his noble form, nor hear his eloquent and burning words, but *he still lives*. He is one of those men who possess two immortalities—one, his own individuality, which he has carried with him to the future state, and the other remains with us in our hearts and in the annals of science to the end of time.

Reference has been made to personal acquaintance with the deceased. I was not as highly favored as some of the gentlemen who have spoken, but happily not altogether without being able to record with gratitude my knowledge of him, and the benefits derived from his lectures. As a disciple, I once enjoyed two full courses of his lectures, on Fishes and Geology, and then sat at the feet of Professor Mitchell, of the Cincinnati Observatory, and afterwards at the feet of Professor Guyot, of Princeton College, so honorably mentioned in your presence. And from these masters of scientific lectures I derived views of the laws of Nature and the works of God, for which I desire to acknowledge my deepest gratitude.

Let us then thank our Heavenly Father for the advance of Science, and for the life, character, labors, and contributions to true science of Louis Agassiz. And as it is a true saying, "They mourn the dead aright who live as they would wish us to live," so let us in our several spheres endeavor to imitate the noble deeds of our illustrious dead; remembering that he said "he had no time to make money." And he was right. Thank God he gave his time, strength, genius, and heart to a far nobler purpose. To make money requires time, skill, and talent. It is a trade—a business—and in its place all right; but it is not the highest calling of man. It is not in itself the greatest good. What is gold, gold to thought, to the enjoyments of a cultivated mind? Like him, then, let us go forth from this memorial meeting to give more of our time, and strength, and substance, to the enlightenment, mental culture, and advancement of our fellow-men, in the knowledge of all truth.

The following from our fellow member, Mr. Henry Edwards, whose engagement elsewhere prevented his attendance, was inadvertently omitted:

Remarks of Henry Edwards.

"O! what a noble heart was here undone,
When Science self destroyed her favorite son."

From a seat of learning in the North has gone forth a wail of sorrow, a wail which echoes not only through the length and breadth of our own land, but in every place in which refinement and culture have found a home, and which will thrill for years to come in many a heart at the mention of the name of the departed. Agassiz is dead. The mighty brain in which grand thoughts were kindled, is, as far as our earth is concerned, at rest for ever; the smile which ever shone on modest merit beams for us no more; the kind and gentle voice which spoke in earnest sympathy with even the meanest endeavor, is hushed and still, and memory is all that is left us of one so loved. To speak in praise of his vast acquirements would be but

"To guard a title that was rich before."

The history of his adopted country will inscribe them on its brightest pages, and his works will be forever cherished amid the records of the nation. But apart from the homage which the worshippers of his genius will surely lay before its shrine—apart from the consideration of the labors which have rendered him immortal, and enrolled his name among the deathless few—there steals into the thought the recollection of that tender and gentle nature which was so magnetic in its association, and which shed so pleasing an influence upon all which came within its contact. Involved in his own cherished pursuits, he scorned the mean pretenses of the world, and being, as he himself declared, "Too busy to make money," he was utterly free from the taint of selfishness, and lived less for his own advancement than for the good of others, preferring the calm enjoyment of a studious and retiring life to the tinsel glories of wealth and display. Mindful of the difficulties which beset the student of Science, and well knowing how willingly the world will sneer at what it cannot comprehend, his hand was ever extended to help the seeker after truth, and to place his feet upon a firm foundation. A father among the young, a brother among the mature, and a kind and gentle friend to all, the name of Agassiz will be loved as his genius is honored, and his childlike nature cherished as his mental powers are valued and esteemed. Above the earth which covers his remains will be mingled the bitter regrets for the loss of one so gifted, and the sighs of sympathy for those who will miss the communion of a loving heart. As on and on we journey towards the end, the pathway of our life is strewn with sorrowing memories; but the blossoms of existence diffuse their fragrance by the wayside, and teach us that all is not sad for those who mourn. The incense of good deeds ascends to Heaven, and the place which so glorious a soul as his filled on earth, becomes a monument for after time, and points to the generations which follow, the shining remembrance of his power. For over fourteen years the writer has held pleasant intercourse with him; has profited by the varied store of knowledge he was ever so ready to impart; and with a saddened soul would add this poor tributary leaf to the garlands which will deck his tomb. He is but one among the many who have felt the friendly interest which Agassiz was wont to display to all who needed the help of such a teacher, and who, in the years to come, will sigh

"For the touch of a vanished hand,
And the sound of a voice that is still."

Mr. W. H. Dall, of Committee, submitted the following resolutions:

Resolutions of the Academy.

WHEREAS, we, the members and associates of the California Academy of Sciences, have learned that it has pleased Divine Providence to call our friend and fellow-member, Prof. Louis Agassiz, away from his earthly labors; Therefore be it

Resolved, That in the death of Prof. Agassiz we recognize the loss of one whose life was passed in earnest devotion to the advancement of Science and the cause of liberal education; whose labors in this field have won for him an

enduring fame throughout both hemispheres ; whose efforts in this his adopted country have, more than those of any other individual, contributed to a wide popular appreciation of the dignity, value, and importance of scientific research, and to the necessity of incorporating in our schemes of education, instruction in those laws which form the foundations of the Natural Sciences and are inseparably connected with our material and intellectual prosperity ; whose geniality and enthusiasm in the pursit of his favorite studies, and whose unequaled power of presenting the results of those studies to the public in a simple and attractive form, have endeared to the hearts of this nation, and especially to us and others, who are more or less individually concerned in the pursuit of scientific truth.

Resolved, That we believe that to Prof. Agassiz and the pupils whom he influenced by his teachings and example, we largely owe the adoption of that wise liberality, exhibited by the government and by many private individuals, in matters relating to scientific exploration and research, which is so justly the pride of American citizens.

Resolved, That the visit of Prof. Agassiz to this community, his genial presence, and his address before the Academy and its friends, will always be held by us in grateful remembrance.

Resolved, That we deeply regret the bereavement of Prof. Agassiz' family and would offer them our sincere and respectful sympathy.

Resolved, That these resolutions be printed in the Academy's Proceedings, and that the Secretary be directed to forward an engrossed copy to the family of the deceased.